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THE EFFECT OF NITRIC OXIDE ON MCF-7 BREAST CANCER CELLS

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TABLE OF CONTENT

ABSTRACT

SNP is widely used as an emergency anti-hypertensive. It is a short-acting NO• donor. NO• has a single unpaired electron and is therefore called as a free radical. It has a half-life of only 5-6 seconds. NO• activates guanylate cyclase in vascular smooth muscle and causes an increase in production of cGMP. This eventually leads to vasodilation. Recently, tamoxifen is used as a treatment for ER+ by blocking the ER. Here we studied the used of SNP as an alternative way to treat ER+ BC. In MCF-7 cells, NO• release by SNP was targeted to interact directly with IRP and caused a conformational change of the protein, which mimicked the effect of Fe starvation. At high concentration of NO• release by this SNP, it was expected to cause an accumulation of *p53* and eventually lead to a programmed cell death. We hypothesised that NO• can cause cytotoxicity to MCF-7 at micromolar concentration. Two different assays were carried out in order to prove this hypothesis. Griess assay was performed to indirectly measure the concentration of NO• release by SNP while MTT assay was performed to measure the percentage of cell viability. We concluded that NO• did not cause cytotoxicity to MCF-7 as there was no significant difference in the percentage of cell viability as the cells were treated with SNP.

Keyword: breast cancer, MCF-7, ER+, SNP, NO•, *p53*

CHAPTER ONE

INTRODUCTION

1.1 Background of Study

Breast Cancer (BC) is one of the most common cancer and the leading cause of cancer death in women all over the world (Jemal et al., 2011). In 2003, National Cancer Registry (NCR) of Malaysia has received 3,738 of new cases of BC. This indicates that 1 in 20 women in Malaysia may develop BC in their lifetime based on the age-standardised incidence rate (ASR) of 46.2 per 100,000 women (Yip et al, 2006). BC is characterised by uncontrolled growth of abnormal cells in mammary glands or ducts. Most BC are one of two types which are ductal carcinoma or lobular carcinoma (McConnell, 2007).

Besides that, patients who suffer from this heterogeneous disease are also classified according to the status of three specific receptors (Reis-Filho & Tutt, 2008). The first type is patients with oestrogen receptor-positive tumours (ER+), where oestrogen receptors (ERs) are likely to respond to therapies that inhibit the growth effects of the hormones. The second type is patients with human epidermal growth factor receptor